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ABSTRACT

Because existing experimental measures of vocational maturity were too narrow or difficult to administer and score, the Career Development Inventory (CDI) was developed to evaluate the effects of a computer-based vocational guidance system on the vocational development of high school students, and early research suggests that the CDI promises to be an important aid in research and counseling for vocational development. The CDI consists of three factor-analytic scales, including: (1) Planning Orientation, which represents the degree of the student's awareness toward planning and choice, (2) Resources for Exploration, which assesses the quality or soundness of individually used and potentially available resources, and (3) Information and Decision Making, which samples the amount of educational and occupational information and the use of the information for sound decisions. Test-retest reliabilities for the three scales over a short period of time were above .70, and reliabilities over a 6-month period were above .60, indicating that vocational maturity was a stable characteristic. Tentative results from content validity, criterion-related concurrent and predictive validity, and construct validity studies indicate that the CDI does measure important aspects of vocational maturity. Uses of the instrument for program evaluation, group assessment, and individual counseling are suggested. (SB)

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AN OBJECTIVE MULTIDIMENSIONAL MEASURE OF VOCATIONAL MATURITY: DEVELOPMENT AND VALIDATION

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The career model now widely used in counseling for vocational development views the individual as moving through branching decision points along a number of possible pathways through the educational system and later the world of work. Many psychological and social characteristics interact to determine the course of the individual's career development, and vocational counseling involves relating these factors to predicting the optimal outcome of the next career decision situation, be it high school course planning or occupational entry. Super (1970) provides a concise review of the emergent concepts of vocational life stages and vocational development tasks which underlie the career model approach to vocational counseling.

Focusing on the vocational life stages of adolescence and early adulthood (exploration and establishment) Super and associates in the Career Pattern Study (Super et al., 1967; Super and Overstreet, 1960;

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Jordaan and Heyde, in process) indentified the vocational development tasks as:

crystallizing a vocational preference,
specifying it,
implementing it,
stabilizing in the chosen vocation,
consolidating one's status, and
advancing in the occupation.

Some of the attitudes and behaviors associated with these tasks are: true perspective shown by awareness of the need to crystallize, the use of resources in exploration, awareness of factors to consider, acquisition of information concerning the preferred occupation, and knowledge of decision-making principles. The Career Pattern Study (CPS), a twenty-year longitudinal study of eighth and ninth grade boys, began to collect and analyze data to test the adequacy of this theorizing.

Vocational Maturity

Vocational maturity, a concept introduced (Super, 1955) as an indicator of the relative degree of vocational development, was defined as the coping behavior of the individual, compared with that of others dealing with the same vocational tasks. At the ninth grade level indices of vocational maturity which met the criteria for construct validity included those assessing time perspective or planfulness, exploratory behavior, and occupational information. Ability, exposure to opportunities for the arousal of interest and for the use of abilities and interests, and taking advantage of such opportunities were related to vocational maturity. A later study of the relationship between adolescent vocational maturity and young adult career development measures

(Super et al., 1967) found that vocational maturity as assessed by occupational information, planning, and interest maturity showed significant relationships to vocational success in young adulthood.

In a smaller-scale longitudinal study of eighth grade boys and girls based on modified CPS procedures, Gribbons and Lohnes (1968, 1969) developed an eight-scale measure of vocational maturity called Readiness for Vocational Planning. One general factor, called vocational maturity, plus three other factors, emerged from the scale scores, thus strengthening the CPS hypothesis that vocational maturity is a valid construct composed of several separate factors. The RVP scales were later revised into a shorter unitary scale called Readiness for Career Planning (RCP).

In a large-scale project to improve the definition, model and measurement of vocational maturity, Crites (1961, 1965, 1969) grouped the various vocational maturity indices into choice competencies and choice attitudes. This arrangement made clearer the cognitive or intellectual and conative or attitudinal aspects of the choice-making factors (as opposed to consistency and wisdom factors) of his concept of vocational maturity. To date he has constructed a standardized instrument to measure choice attitudes, the Attitude Test of the Vocational Development Inventory.

As part of a more recent effort to specify and measure aspects of vocational maturity, Westbrook (Westbrook and Cunningham, 1970) has constructed an objective instrument, the Vocational Maturity Test, to measure cognitive elements of vocational maturity as occupational information

and decision-making or problem-solving ability (Westbrook and Clary, 1967).

The Career Pattern Study, in its pioneer search for both indices of and criteria for vocational maturity, employed a broad range of measurement techniques from standardized tests and inventories to ratings of verbatim interview transcripts. Psychometric neatness was sacrificed to breadth and depth of investigation. Gribbons and Lohnes' Readiness for Vocational Planning scales were scored from interview protocols, making the process cumbersome and somewhat subjective. The shorter, unitary Readiness for Career Planning scale is scored from an interview or a short answer inventory.

Thus it is that to date that the multi-factor measures of vocational maturity have been difficult to administer and/or imprecise or subjective to score. The objective, easily scored instruments have not yet measured more than one factor in the theoretical structure of vocational maturity.

Development of the Instrument

The present instrument, the Career Development Inventory (CDI), had its beginning when a team of Teachers College evaluators undertook to devise an instrument to measure the effects of the Educational and Career Exploration System (ECES), an experimental computer-based vocational guidance system developed by IBM in consultation with Teachers College professors (Minor et al., 1969), on the vocational development of high school students in Montclair, New Jersey. An 87 item Student Questionnaire was designed as a measure of vocational maturity and contained six scales:

Vocational and educational planning maturity
Knowledge of decision-making principles
Amount of decision-making information (job information)
Amount of decision-making information (utility of sources)
Quality of decision-making information
Responsibility for decision-making.

Results obtained with this questionnaire/instrument (Thompson et al., 1970) indicated need for a more efficient, more easily administered and scored instrument when the large-scale evaluations of ECES began in Genesee County, Michigan, in 1970-71. For this the authors of the CDI (Super et al., 1971) turned again to the work of the Career Pattern Study.

In the original CPS attempt to measure vocational maturity an extensive questionnaire and interview were scored to yield twenty indices grouped under six major dimensions (Super and Overstreet, 1960). Many of the indices were difficult to derive. Later research revealed that five of them turned out to have particular value:

Concern with choice
Acceptance of responsibility for choices and planning
Specificity of information about preferred occupation
Use of resources in orientation.

Using the above indices, the items/scales developed for the first ECES evaluation, and their knowledge of the research projects previously mentioned, the authors devised an instrument consisting of eleven a priori scales designed to measure dimensions of vocational maturity:

Concern with choice
Acceptance of responsibility
Occupational information
Planning
Use of resources
Crystallization of vocational self-concept
Crystallization of vocational preferences
Agreement between personal characteristics and vocational preferences
Accuracy of self-appraisal
Work experience
Knowledge and use of decision-making principles

The instrument was pilot tested, revised to 236 items, named the Career Questionnaire (CQ), and used in the evaluation of the first year of the field trial of ECES in Genesee County (Myers et al., 1971).

In an effort to measure all of the hypothesized dimensions of vocational maturity, the Career Questionnaire included some scales which required information not provided in the test items - interest and work value scores, grade point averages, etc. It was equally important, however, to study the CQ as an independent instrument fulfilling the measurement needs mentioned above, for it was only as a free-standing instrument that it could be widely and easily used. To that end 13 free-standing, conceptually adequate indices were selected and studied using the pre-test results of a representative sample of 200 sophomore male and female students from the public high schools of Genesee County. This analysis was reported by Forrest (1971).

The analysis of the 13 scales involved measuring a variety of psychometric characteristics necessary to assess performance and theoretical

meaning of the scales: means, standard deviations, and ranges; reliabilities (.33 to .83); differentials of means and variances by sex; increases in scores across grades eight, ten, and twelve, a necessary criterion for an instrument purporting to measure a developmental variable; relationships to two status characteristics (level of vocational preference and level of father's occupation) and two behavioral characteristics (ninth grade point average and verbal aptitude); and relationships with three measures of vocational maturity in various stages of experimental development. The last two sets of measures will be explained in greater detail in a later section on the study of validity of the resultant CDI.

The last step in the analysis of the 13 scales involved a factor analysis of scale scores to determine underlying dimensions around which the scales might be grouped. Four factors account for nearly 56 per cent of the total variance.

The final revision of the instrument involved study of individual scales in the light of their contributions to the four factors, their performance characteristics, their reliabilities and increases across grades, and their relationship to the four variables and the three measures. As a result of this study five of the 13 scales were dropped, and the remaining eight were arranged into three scales of 33, 30, and 30 items, respectively, for a total of 93 items. Two items were later dropped from Scale B due to their nearly identical performance with two similar items. The resultant instrument was called the Career Development Inventory (CDI). The three scales of the CDI thus represent readily assessed important aspects of vocational

maturity. The aggregate of the scales represents an overall measure of vocational maturity defined by the individual scales.

Description of the Instrument

Scale A, Planning Orientation, represents the degree of informed planfulness. It involves relating information about one's self and potential vocations, but it need not, however, result in firm plans. It includes measures of concern with choice, specificity of planning, and self-estimated amount of occupational information. It is an attitudinal measure, a self-rating scale which reflects a planning approach to a career.

Scale B, Resources for Exploration, represents a self-rated assessment of the used and available resources for use with these planning activities, resources from which a student learns about educational opportunities, occupations, and himself. It too reflects attitudes, those of concern, inquiry, and trial. Specifically, Scale B is a measure of the quality of the actually used and potentially usable resources for career (educational and vocational) exploration.

Scale C, Information and Decision Making, unlike Scales A and B, is a cognitive measure by design (containing information and problem solving items) and as shown by correlations with verbal intelligence and grade-point average. It assesses the student's possession of actual occupational information and his knowledge of how to integrate personal and occupational information into educational and vocational decisions.

While Scale A represents the degree of the student's awareness of an inclination toward planning and choice, Scale B assesses the quality or

soundness of individually used and potentially available resources, and Scale C samples the amount of the educational and occupational information the student has acquired together with his mastery of the use of information for sound decisions. Thus both attitudinal (self-rated and subjective) and cognitive (factual and objective) aspects of vocational development are tapped by the instrument.

Sample items from the three scales are presented in Appendix A. The instrument can be administered easily to junior and senior high school students in one class period. Small numbers of protocols can be scored by hand, but a computer based scoring system is also available. The overall reading level of Form 1 of the CDI, the determination of which was the final step in revision and development, is at the sixth grade according to the Dale-Chall (1948) method which relies on a combination of sentence length and familiarity of words to fourth grade students. Raw score percentile norms for the three scales and total score for 400 male and female tenth graders are available in the preliminary manual (Super and Forrest, 1972). Correspondence concerning further information about the instrument and the manual should be directed to Donald E. Super, Box 214, Teachers College, Columbia University, New York, New York 10027.

Statistical Characteristics of the Instrument

After the Career Development Inventory was revised the new version was subjected to the same analytic studies as were the 13 scales. The subjects for this analysis were a second sample of 200 male and female

high school sophomore students parallel to and drawn at the same time as the first sample. Career Questionnaire protocols for all 400 were re-scored according to the CDI method. Scores for the two samples were not significantly different on any scale or on total score. Summary statistics for raw scores are presented in Table 1.

Table 1.

Summary Score Statistics for
Career Development Inventory Scales

Scale	N	Mean	S. D.	Actual Range	Possible Range	No. of Items
A	199	103.11	18.61	57-147	33-165	33
B	196	234.81	42.94	135-332	88-440	30
C	198	17.08	4.39	5-26	0-30	30
Total	193	356.38	55.73	232-471	121-635	93

There are no significant differences in score means and variances between males and females on the CDI scales. The small differences which had appeared in the information items of the earlier version of the instrument were attributed to unequal familiarity with item content; these items, now part of Scale C, were revised. Form 1 of the CDI, therefore, does not discriminate between the sexes and may be used with coeducational groups.

An important characteristics for an age-related developmental variable is its evidence of increase with age and experience. Within groups of similar age, scores should be relatively stable over short periods of time,

but they should increase across age groups (Super et al., 1957; Crites, 1965). To study grade differences in the CDI scores the instrument was given to 81 twelfth graders in a suburban high school, to 77 tenth graders in the same high school, and to 89 eighth graders in an adjacent (feeder) junior high school. A one-way analysis of variance of means was performed on the three sets of scales. Means and F ratios are presented in Table 2. The trend toward higher scores with increase in grade level is clearly significant. Inspection of the means shows significant and substantial increases which are uniform across the three grade levels for all scales. Since the data are cross-sectional (different students in each grade), they must be interpreted with caution; however, the low drop-out rate in these schools suggests that the principal difference in the samples is one of age and experience.

Table 2.

Grade Differences: Eighth, Tenth, and Twelfth Grades: Analysis of Variance

	Eighth Grade		Tenth Grade		Twelfth Grade		Degrees of	
Scale	N	Mean	N	Mean	N	Mean	Freedom	F
A	79	92.03	74	104.28	74	116.60	2;224	29.51**
B	78	208.47	66	226.00	78	257.32	2;219	28.10**
C	82	12.36	69	16.97	74	19.87	2;222	56.81**
Total	66	318.54	60	347.73	70	395.97	2;193	36.05**

** $p < .01$

The reliability of the CDI scales was ascertained with the test-retest method, measuring the consistency of subjects' responses over a short time. The test-retest sample consisted of 82 male and female tenth graders, selected from classes in four different schools representative of the county. The interval between test sessions varied from two to four weeks. The reliability coefficients are reported in Table 3. The reliabilities for Scales A and B, the attitudinal scales, are considerably higher than that for Scale C, the cognitive scale. All, however, are above .70, a minimum level desired in an instrument to be used in group assess or program evaluation.

Table 3.

Test-Retest Reliability Coefficients of the Career Development Inventory Scales Obtained from 82 Tenth Graders after an Interval of Two to Four Weeks

Scale	N	r
A	62	.85**
B	65	.82**
C	48	.71**
Total	36	.87**

** $p < .01$

As part of the evaluation study of ECES in Genesee County, Michigan, tenth grade students were administered the CDI in the late Fall and again about six month later in May. Control subjects were not exposed to ECES and had the normal school educational and vocational guidance experiences

during the six month period. Table 4 shows the stability coefficients for the control students on the three factor scales and the total score. Vocational maturity, as measured by the CDI, appears to be a rather stable characteristic over a six month period.

Table 4.

Stability of Career Development Inventory Scales over Six Months for Tenth Grade Males and Females

Scale	N	r
A	1010	.71
B	1023	.63
C	1005	.68
Total	692	.70

Validity Studies

As stated in the APA Standards (1966) validity information indicates the degree to which an instrument achieves its aims. In the broadest sense these aims are three-fold: determining an individual's performance at present in the universe of situations which the instrument claims to represent; estimating an individual's true present standing or predicting his future standing on some variable of importance which is different from the instrument; or inferring the degree to which an individual possesses some hypothetical trait presumed to be reflected in performance on the instrument.

The three aspects of validity corresponding to these aims are content validity, criterion-related concurrent and predictive validity, and construct validity. Study of the validity of the Career Development Inventory was designed with all three aims in mind, and the sections below deal with all three types of validity information.

Content Validity

The item content of the three factor-analytic derived CDI scales provided a basis for the definition and the name of each of the scales. Items for Scales A, Planning Orientation, and B, Resources for Exploration, were selected or drafted by the team of authors (Super et al., 1971) in the main from theoretically-derived and empirically refined scales used in previous instruments, as explained earlier. The final set of items used in the two scales was derived by logic and factor analysis from the earlier version of the instrument. Both the decision-making and the information items in Scale C, Information and Decision Making, were selected from a pool of items created for the earlier version of the instrument; these items were individually studied for psychometric and conceptual adequacy by the authors, and unsatisfactory items were eliminated. The content validity of the CDI Scales is thus established by expert judgment that the scales' items assess, by repeated examination of their content and psychometric characteristics, the attitudes and behaviors indicated in the scale names.

Criterion-related Validity

Criterion-related validity is demonstrated by comparing scores with

external variables believed to provide direct measures of relevant consequent behaviors, concurrently and/or predictively. In practice this generally proves difficult because behavior is complex and multipy-determined. Criterion and construct validity are thus closely interwoven. In addition, concurrent criteria must often be used until longitudinal studies mature, making predictive criteria available without questionable inferences concerning consequences. Criterion-related validity was studied through examination of the relationship of the CDI scales to four other relevant but not necessarily causal or consequential variables: a rating of the socioeconomic level of father's occupation, a rating of the student's own vocational preference level (these two are rated on Hamburger's 1958 revision of Warner's Scale), aptitude as measured by the SRA-Verbal Test, and grade-point average for ninth grade courses. Means and standard deviations of these ratings and scores for 200 tenth graders are provided in Table 5.

Table 5.

Means and Standard Deviations of Scores for 200 Tenth Graders on Level of Father's Occupation, Vocational Preference Level, SRA-Verbal Stanine, and Grade-Point Average

Variable	N	Mean	S. D.
Level of Father's Occupation[1]	171	4.50	1.33
Vocational Preference Level[1]	152	2.98	1.46
SRA-Verbal[2]	170	5.84	1.91
Grade-Point Average[3]	180	2.64	0.79

1 Rated on a scale of one to seven where one is high.
2 Based on percentile scores converted to stanines.
3 Based on a 4.00 system.

The two status variables, levels of father's occupation and student preference, and the two behavioral variables, GPA and verbal intelligence, are clearly not measures of vocational maturity itself, but might be considered variables important in helping to circumscribe the limits of the concept of vocational maturity. While career development may be related to level of father's occupation, as it was in the Career Pattern Study (Super and Overstreet, 1960), it would be desirable to have a culture-free measure of vocational maturity, and one that is independent of level of vocational preference. To the extent that vocational maturity is attitudinal, it may be expected to be unrelated to aptitude but somewhat related to achievement. To the extent that it is cognitive, it may be expected to be related to aptitude and more closely to achievement (criterion validity).

Table 6 reports the correlations of the CDI scales for 200 male and female tenth graders with these four concurrent criterion variables. Most of the correlations are statistically significant but of a low order. Only Scale C, Decision Making and Information, as anticipated, correlates moderately with verbal aptitude and grade-point average.

Table 7 examines the individual scale contributions to the multiple correlation of the combined CDI scales with the four criterion-related variables. The three CDI scales are similar in contributing little to the prediction of the levels of father's occupation and vocational preference. With verbal aptitude and grade-point average, it is clearly Scale C, the cognitive scale, which accounts for most of the relationship.

Table 6.

Correlations of Career Development Inventory Scales of 200 Male and Female Tenth Graders with Four Variables -- Level of Father's Occupation, Vocational Preference Level, SRA-Verbal Stanine and Grade-Point Average

	LFO		VPL		SRA-V		GPA	
Scale	N	r	N	r	N	r	N	r
A	170	.22**	151	.23**	169	.19*	179	.23**
B	169	.15	150	.21**	168	.24**	177	.28**
C	165	.22**	145	.33**	164	.49**	173	.59**
Total	165	.18*	145	.27**	164	.27**	172	.34**

*$p < .05$; **$p < .01$

Note: The correlation coefficients for Level of Father's Occupation and Vocational Preference Level, which are inversely scored, have been reversed for consistent interpretation.

Table 7.

Multiple Correlation Coefficients and Beta Weights for
Career Development Inventory Scales
Level of Father's Occupation, Vocational Preference Level,
SRA-Verbal Stanine, and Grade-Point Average for 236 Tenth Graders

	LFO		VPL		SRA-V		GPA	
Item	Coef.	b	Coef.	b	Coef.	b	Coef.	b
R	.21*		.29**		.43**		.46**	
R^2	.04		.08		.19		.22	
Scale A		.10		.13		.12		.05
Scale B		.00		.12		.01		.11
Scale C		.16		.15		.38		.40

* $p < .05$; ** $p < .01$

Note: For consistent interpretation the signs have been reversed for the beta weights of Level of Father's Occupation and Vocational Preference Level, both of which are inversely scored.

In summary, the CDI scales are virtually unrelated to the levels of father's occupation and own vocational preference, measures of present and hoped for socioeconomic level. Scales A and B, the attitudinal scales, are also similarly unrelated to verbal aptitude and to GPA, while the cognitive Scale C is appropriately moderately related to the two behavioral characteristics.

Studies of the predictive validity of the CDI, using appropriate consequent vocational behaviors such as wisdom of subsequent course of study or occupation entered, or realism of reasons for changing positions, are not yet available.

Construct Validity

Construct validity is defined as evidence that the test measures the characteristics that it claims to measure. It thus shows the degree to which performance on the test actually is associated with theoretically related characteristics or test scores. The four variables discussed in the section on criterion-related validity also contribute evidence on construct validity in that they help define what it is that the CDI scales measure. The simplest type of construct validation involves establishing relationships with other tests known to assess the traits in question.

This last type of construct validity is difficult to establish for the CDI because there is no established measure of vocational maturity. There are, however, three instruments in various stages of development which attempt to measure aspects of vocational maturity, one of lesser practical utility

but satisfactory for small scale research, the others readily administered and scored. These instruments, as discussed above, are the readily used Attitude Test of the Vocational Development Inventory (VDI) by Crites, the individually administered and subjectively scored Readiness for Career Planning scale (RCP) by Gribbons and Lohnes, and the Vocational Maturity Test (VMT) by Westbrook. To compare the CDI scales with each of these three instruments, each of which provides one single score, the pairs of instruments were administered to groups of tenth graders. The sizes of the groups, the means, and the standard deviations are presented in Table 8.

Table 8.

Means and Standard Deviations for Three Groups of Tenth Graders on Three Vocational Maturity Measures

Measure	N	Mean	S. D.
Attitude Test of the Vocational Development Inventory	111	35.04	5.13
Readiness for Career Planning	16	18.69	7.04
Vocational Maturity Test	32	58.34	10.69

It should be noted that the size of the group taking the Readiness for Career Planning scale is quite small because of administration and scoring difficulties; it should further be noted that the group taking the Vocational Maturity Test (also small because the test was ready for use late in this research) had a grade-point average over 3.0, a fact which may bear on the comparisons which follow.

Table 9 presents the correlations of the CDI scales with the Attitude Test of the Vocational Development Inventory and the Readiness for Career Planning scale. The Scales A and B and the Total CDI score are virtually unrelated to the VDI, the number of subjects being large enough for confident conclusions; Scale C, however, does yield a moderate relationship, a fact which is more clearly illustrated in Table 10, which reports the multiple correlation coefficients and beta weights for the CDI scales with the VDI. These relationships are particularly important because the VDI is intended to be an attitudinal scale, with items in a true-false format, whereas Scale C of the CDI contains only cognitive items. The study from which these data are taken (Forrest, 1971) also found moderate relationships between the VDI, verbal aptitude (.37), and grade-point average (.42) for 77 tenth graders, similar to those found for the CDI Scale C. Crites' VDI thus appears to be in fact, although not in design or theory, largely a cognitive scale.

All CDI scales correlate substantially (Table 9) with the Readiness for Career Planning scale. This is not surprising since the RCP was developed from the early work of Super and associates (1957, 1960), upon which much of the CDI is also based. Here not only Scale C, the cognitive scale, but also Scales A and B, which are attitudinal, are highly related to the RCP measure of vocational maturity.

Table 11 reports the relationship of the CDI scales to the Vocational Maturity Test for 32 tenth graders. Only Scale C is clearly related to the VMT. Both are cognitive measures with fairly similar content. In the

Table 9.

Correlations of Career Development Inventory Scales with the Attitude Scale of the Crites' Vocational Development Inventory, the Gribbons and Lohnes' Readiness for Career Planning Scale, SRA-Verbal Stanine, and Grade-Point Average for 110 Tenth Graders

Scale	VDI-AS N	VDI-AS r	RCP N	RCP r	SRA-V N	SRA-V r	GPA N	GPA r
A	102	.13	15	.74**	87	.18	94	.36**
B	101	.10	15	.67**	87	.20	94	.35**
C	100	.42**	15	.61*	86	.46**	93	.44**
Total	90	.14	15	.75**	77	.26*	84	.42**

*p < .05; **p < .01

Table 10.

Multiple Correlation Coefficients and Beta Weights for Career Development Inventory Scales with the Attitude Scale of the Vocational Development Inventory for 77 Tenth Graders

Scales	Coefficient R	Coefficient R^2	b
Combined	.43**	.18	
Scale A			-.02
Scale B			.04
Scale C			.42

**p < .01

Table 11.

Correlations of Career Development Inventory Scales with the Cognitive Vocational Maturity Test, SRA-Verbal Stanine Scores, and Grade-Point Average for 32 Tenth Graders

Scale	CVMT N	CVMT r	SRA-V N	SRA-V r	GPA N	GPA r
A	23	.31	14	-.19	23	.20
B	25	.20	16	.48	25	.11
C	22	.63**	15	.68**	22	.38
Total	19	.26	13	.24	19	.22

** $p < .01$

original study the VMT was found to correlate .62 with SRA-verbal scores and .53 with ninth grade grade-point averages for the tenth graders.

In summary, the two attitudinal scales of the CDI relate highly to the designedly global RCP scale, as does Scale C, the cognitive scale. The latter relates most strongly to the designedly cognitive VMT. The relationship with the VDI, intended as an attitudinal measure, is nearly entirely with the cognitive Scale C. Further studies of the relationships of these four instruments to each other and to behavioral criteria are needed and will be conducted.

Summary

The original question about validity concerned the degree to which the CDI achieved its aims as an instrument. Content validity was established by design, judgment, and psychometric evaluation. Concurrent criterion-related validity was tentatively demonstrated by relating scale scores to two status characteristics and to two behavioral characteristics. All three CDI scales demonstrated the expected low (but significant) relationships with the status variables. Also as expected, the two attitudinal scales were virtually unrelated to verbal aptitude or achieved grades, whereas the cognitive scale demonstrated a moderate relationship to the two variables. The increase in scale scores across grades mentioned in the previous presentation could be taken as a fifth piece of evidence of current criterion-related validity. Each of these relationships demonstrates that the CDI relates in expected ways to variables considered relevant in circumscribing

vocational maturity. Construct validity was presented through the demonstration of expected relationships of the CDI scales with the other instruments in the field. These relationships were in the expected direction except for that with the VDI which appears to be much more cognitive in nature than had been expected.

Uses of the Instrument

Once the soundness of the instrument is established, as the initial evidence presented above indicates, the question turns to its usefulness. If the CDI does indeed measure important aspects of vocational maturity, then in what ways can such scores be useful in enhancing individual development of vocational maturity, or in evaluating programs that intend to do so? In what ways might it be valuable in counseling, assessment, and evaluation? While addressing these questions, it should be remembered that the CDI does not measure aptitude, school achievement, or occupational skill and competence. The CDI seeks to assess career or vocational development, the manner in which adolescents cope with the vocational development tasks with which society confronts them.

Program Evaluation

The immediate reason for the construction of the Career Development Inventory was to help with the evaluation of ECES, the computer-based educational and vocational counseling system mentioned earlier. The results obtained with the CDI in the first year of the evaluation are reported by Myers et al. (1971). It is also being used to evaluate a course in career

development for inner-city ninth graders in New York City. Its content is appropriate for use in evaluating the impact of many types of educational and vocational guidance programs, services, and activities intended to enhance the vocational development of students in junior and senior high school or in the first year of post-high school education. As described in the Preliminary Manual (Super and Forrest, 1971), the CDI does not attempt to assess the degree to which all potential realistic goals of adolescent vocational development have been attained. It does, however, assess three of the important desired outcomes: 1) the development of a planning orientation toward a career, 2) familiarity with and use of the resources which can be useful in vocational exploration, and 3) knowledge of occupations and of career decision-making principles.

There are several important considerations to be kept in mind when selecting an instrument for program evaluation (Bohn, 1972). First, the relevance of the instrument to the objectives and the desired outcomes of the program to be evaluated is a primary issue. What the program seeks to accomplish must be consonant with what the instrument claims and has been shown to measure. The fact that the CDI calls itself a measure of career development does not automatically make it the appropriate instrument for assessing the impact of any particular career development program. Secondly, one must consider the amount of impact which reasonably can be expected from the program. Experiences relevant to vocational development and occupational choice cumulate over a lifetime, and short-term experiences

combined with short-term evaluation make difficult the task of any instrument to detect changes. Lastly, the relative sensitivity of an instrument which can be administered in one school period must be considered. Finding statistically and practically significant differences between groups is most difficult when evaluation time is short.

In summary, these notes on the use of instruments like the CD I are intended not to be pessimistic but to be helpful. The CDI is considered a good instrument for its stage of development in its field, but potential users should know its limitations and the related problems with which they must cope. Reference to the Preliminary Manual will provide further discussion of the above points.

Group Assessment

The CDI may be used to ascertain the level of vocational maturity reached by different groups of students classified by age, grade, sex, work experience, etc. Such comparisons can be useful in deciding what types of career development experiences may prove helpful to a particular category of student. A high-scoring group would presumably be ready for occupationally focused activities while a low-scoring group might profit more from orientation toward planning occupations. This approach is a form of assessment of group readiness for vocational planning for use in curriculum development and instruction.

Individual Counseling

The Career Development Inventory is intended also to be used with

individual students in counseling. The initial studies have dealt only with groups of students, but norms for the group of students representing the tenth graders of Genesee County, Michigan, are available. Interpretation of individual profiles must take into account, of course, the error of measurement of the scales so the importance of a difference between scale scores can be judged fairly. Further information concerning the meaning of individual scale scores to other developmental variables is also needed.

While the need for such data is recognized, the possible counseling significance of differential scores can still be explored. Jordaan (1972) recently suggested ways in which individual profiles might be used to help diagnose and repair deficiencies or to build on strengths in terms of readiness for planning and for exploratory and reality-testing experiences. Much exploration and trial in the school years appears to be aimless rather than purposeful. To the extent that the CDI scales reflect the meaning of the student's vocational experiences, the CDI scores should prove helpful in determining the student's readiness for certain learning and exploratory experiences which are most likely to repair deficits or build on existing strengths.

Conclusions

In a recent paper summarizing research and proposing a theoretical developmental model of vocational maturity, Super (1972) emphasizes again that early adolescence is an exploratory period in which youth have not progressed sufficiently to make sound directional vocational decisions.

It is a preparatory period, and adolescents vary greatly in vocational maturity, in the planfulness of their approach to life, in their tendencies to anticipate choices they will have to make, to explore alternatives, and to acquire relevant information. Educators and counselors need means of assessing these characteristics if they are to help students gain meaningful knowledge and experience toward satisfactory decision making..

> Career prediction...is the essence of vocational counseling when more is involved than a decision about a specific job, but counselors have so far had little in the way of data and instruments to help make such predictions. Essential to career prediction and guidance is an assessment of readiness to make the decisions that are called for at a given decision point (Super, 1972: 2).

The Career Development Inventory was designed to meet this need. It was developed initially to help evaluate a specific program because the existing experimental measures of vocational maturity were too narrow or too difficult to administer and score. The CDI does not pretend to measure all of the important aspects of vocational maturity in one short instrument, but its factor-analytic based scales do provide three theoretically important measures. Initial evidence of important statistical characteristics and validity have been presented, and actual and suggested uses have been discussed. Many questions have been answered only tentatively, but at this early stage of development the Career Development Inventory promises to be an important aid in research on and counseling for vocational development.

Appendix A.

CAREER DEVELOPMENT INVENTORY

Sample Items

Scale A: Planning Orientation

I. How much thinking and planning have you done in the following areas? What kind of plans do you have? For each question below choose one of the following answers to show what you have done.

1) I have not given any thought to this.
2) I have given some thought to this, but haven't made any plans yet.
3) I have some plans, but am still not sure of them.
4) I have made definite plans, but don't know how to carry them out.
5) I have made definite plans, and know what to do to carry them out.

1. Finding out about educational and occupational possibilities by going to the library, sending away for information, or talking to somebody who knows about the possibilities.

2. Talking about career decisions with an adult who knows something about me.

3. Taking high school courses which will help me decide what line of work to go into when I leave school or college.

4. Taking high school courses which will help me in college, in job training, or on the job.

5. Taking part in school or out of school activities which will help me in college, in training, or on the job.

6. Taking part in school or after school activities (for example, science club, school newspaper, Sunday School teaching, volunteer nurse's aide) which will help me decide what kind of work to go into when I leave school.

7. Getting a part-time or summer job which will help me decide what kind of work I might go into.

Scale B: Resources for Exploration

V. Here again are five answers which are to be used with the following items. This time use the statements to show which of the sources of information below <u>have already given you information</u> which has been helpful to you in making your job or college plans.

I have gotten. . . .
1) no useful information
2) very little useful information
3) some useful information
4) a good deal of useful information
5) a great deal of useful information
. . . . from:

48. Father or male guardian.

49. Mother or female guardian.

50. Brothers, sisters, or other relatives.

51. Friends.

52. Coaches of teams I have been on.

53. Minister, priest, or rabbi.

54. Teachers.

55. School counselors.

56. Private counselors, outside of school.

57. Books with the information I needed.

58. Audio or visual aids like tape recordings, movies, or computers.

59. College catalogues.

Scale C: Information and Decision Making

Here, each question has its own set of possible answers.

62. Which one of the following is the best source of information about job duties and opportunities?

1) The Encyclopedia Britannica

2) World Almanac

3) Scholastic Magazine

4) The Occupational Index

5) The Occupational Outlook Handbook

65. The occupational fields expected to grow most rapidly during the next ten years are:

    1) Professional and service.

    2) Sales and crafts.

    3) Crafts and clerical.

    4) Labor and sales.

85. Jane likes her high school biology and general science courses best. She likes to do her schoolwork alone so she can concentrate. When she begins to think about her future occupation, she should consider:

    1) Nurse.

    2) Accountant.

    3) Medical Laboratory Technician.

    4) Elementary School Teacher.

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